What is claimed is

1. A method of forming a transistor gate structure comprising:

providing a substrate within a deposition chamber;

forming a gate dielectric layer over the substrate;

depositing a predominantly niobium monoxide film; and

patterning the predominantly niobium monoxide film to form a niobium monoxide gate.

2. The method of claim 1, wherein forming a dielectric layer comprises thermally oxidizing a silicon substrate to form a silicon dioxide gate dielectric.

3. The method of claim 1, wherein forming a dielectric layer comprises plasma oxidizing a silicon substrate to form a silicon dioxide gate dielectric.

4. The method of claim 1, wherein forming a dielectric layer comprises depositing a high-k gate dielectric.

5. The method of claim 4, wherein the high-k gate dielectric is HfO_2, ZrO_2, Al_2O_3, Ta_2O_5, HfAlO or $HfSiO_4$.

6. The method of claim 1, wherein depositing the predominantly niobium monoxide film comprises:

placing the substrate in a sputtering chamber;

providing a target comprising Nb;

setting the sputtering power and controlling the oxygen partial pressure to produce a predominantly niobium monoxide film.

7. The method of claim 6, wherein the oxygen partial pressure is controlled by introducing a gas selected from the group consisting of argon, neon, helium, krypton, and xenon through a mass flow controller, introducing O_2 through a mass flow controller and adjusting the relative amounts of each gas.

8. The method of claim 6, wherein the oxygen partial pressure is controlled by introducing a combined gas of O_2 and a gas selected from the group consisting of argon, neon and helium, krypton, and xenon and adjusting the flow rate of the combined gas.

9. The method of claim 8, wherein the deposition chamber has a fixed pump speed.

10. The method of claim 8, wherein the mixed gas is between 5% and approximately 30% percent O_2/Ar.

11. The method of claim 10, wherein the mixed gas is 15 percent O_2/Ar.

12. The method of claim 1, wherein depositing the predominantly niobium monoxide film comprises:

placing the substrate in a sputtering chamber;

providing a target comprising NbO;

setting the sputtering power; and controlling the oxygen partial pressure to produce a film comprising a predominantly niobium monoxide.

13. The method of claim 12, wherein the mixed gas is between 0% and approximately 30% percent O_2/Ar.

14. The method of claim 1, wherein patterning to form a gate comprises depositing photoresist over the predominantly niobium monoxide film, patterning the photoresist and etching the predominantly niobium monoxide film.

15. The method of claim 14, further comprising depositing a capping layer overlying the niobium monoxide film prior to depositing photoresist.

16. The method of claim 15, wherein the capping layer is silicon nitride.

17. The method of claim 15, wherein the capping layer is a conductive barrier metal.

18. The method of claim 17, wherein the conductive barrier metal is TiN.

19. The method of claim 1, wherein patterning to form a gate comprises forming a substitute gate; depositing an insulating material; exposing and removing the insulating material to form a trench prior to depositing the predominantly niobium monoxide film; and planarizing the predominantly niobium monoxide film after it has been deposited to fill the trench.